

## WHAT IS CLAIMED IS:

1. An electrode comprising:
  - an electrode body having a first and second side, wherein the first side comprises
  - 5 a flexible barrier layer comprising a heat-sealable material and the second side comprises a conductive layer;
  - an electrically conductive gel layer disposed on the electrode body and which is further in electrical communication with the conductive layer; and
  - 10 a release liner sealed to said flexible barrier layer around a periphery of said gel layer.
2. The electrode of claim 1, wherein the heat-sealable material comprises a thermoplastic polymeric material.
- 15 3. The electrode of claim 1, wherein the flexible barrier layer further comprises a vapor or air barrier material comprising a polymeric film or sheet, a foil material, or a coated substrate comprising a metal, textile, paper, or non-woven material coated with a polymeric material.
- 20 4. The electrode of claim 1, wherein the flexible barrier layer further comprises a vapor or air barrier material comprising a fluoropolymer film.
- 25 5. The electrode of claim 1, wherein the flexible barrier layer comprises a laminate comprising a first layer of a heat-sealable layer comprising polyethylene disposed over a second layer of a vapor barrier comprising a fluoropolymer film.
- 30 6. The electrode of claim 1, wherein the conductive layer comprises a metal sheet or foil, a conductive ink, or a laminate comprising a metal component disposed over a polymeric substrate.

7. The electrode of claim 1, wherein the electrode further comprises a lead wire that is connected to the flexible barrier layer of the electrode and which electrically connects the electrode to a medical device.

5       8. The electrode of claim 1, wherein said release liner is substantially rigid.

9. An electrode system comprising:

a pair of electrodes disposed on opposite sides of a non-conductive release liner, wherein each electrode comprises an electrode body having first and second sides, 10 wherein the first side comprises a flexible barrier layer comprising a heat-sealable material and the second side comprises a conductive layer, and an electrically conductive gel layer interposed between the conductive layer and the non-conductive release liner.

10     10. The electrode system of Claim 9, wherein the electrodes are further in electrical contact with each other through a conductive element that is disposed within the non-conductive release liner and which is in electrical contact with both electrodes through said gel layer.

15     11. The electrode system of claim 9, wherein each electrode further comprises a lead wire that is connected through said first side to said second side of the electrode and which electrically connects the electrode to a medical device.

20     12. The electrode system of claim 11, wherein the lead wire is electrically connected to the conductive layer and the electrically conductive gel by a connector 25 comprising a rivet, ring tung terminal, staple, grommet, screw, bolt, or other electrically conducting fastening means that extends from the flexible non-conductive release liner through the conductive layer.

30     13. The electrode system of claim 12, wherein the electrode further comprises an insulation layer interposed between a portion of the conductive layer and the non-conductive release liner, wherein the insulation layer protects an operator of the electrode

from physical contact with the connector which is electrically connected to an electrical source.

14. The electrode system of claim 9, wherein the non-conductive release liner  
5 comprises a polymeric sheet, coated paperboard, or foam.

15. The electrode system of claim 9, wherein the non-conductive release liner  
comprises a material treated with an adhesion-reducing agent comprising a surface-  
treated polymeric sheet comprising siliconized polyethylene, polypropylene, polyester,  
10 acrylate, polycarbonate, or wax or plastic coated paperboard or foam.

16. The electrode system of claim 9, wherein the conductive layer comprises a  
laminate comprising tin foil and polyester.

15 17. The electrode system of claim 9, wherein the non-conductive release liner  
comprises two sides, each side having a recessed portion to store the electrically  
conductive gel layer of each electrode.

18. A self-storing electrode system comprising:

20 first and second electrode bodies each having a first and second side, wherein the  
first side comprises a flexible barrier layer comprising a heat-sealable material and the  
second side comprises a conductive layer;

an electrically conductive gel disposed on each of the electrode bodies which is in  
electrical communication with the conductive layer of each electrode;

25 a release liner sealed by a seal to the flexible barrier layer to protect and prevent  
desiccation of the gel layer; and

a lead wire electrically coupled to each electrode by means of a path that does not  
pass through the release liner seal.

30 19. The self-storing electrode system of claim 18, wherein the release liner seal  
further comprises a heat-seal formed between the flexible barrier layer and the release  
liner.

20. The self-storing electrode system of claim 18, wherein the flexible barrier layer further comprises a vapor or air barrier material comprising a polymeric film or sheet, a foil material, or a coated substrate comprising a metal, textile, paper, or non-woven material coated with a polymeric material.

21. The self-storing electrode system of claim 18, wherein the flexible barrier layer comprises a laminate comprising a first layer of a heat-sealable material comprising polyethylene disposed over a second layer of a vapor barrier comprising a fluoropolymer film.

22. The self-storing electrode system of claim 18, wherein the release liner is substantially rigid.

23. The self-storing electrode system of claim 18, wherein the lead wire is connected to the flexible barrier layer of the electrode for electrically connecting the electrode to a medical device.